Preliminaries

$$\lim_{x \to 0} \frac{\sin x}{x} = 1$$

$$\sin(A+B) = \sin A \cos B + \cos A \sin B$$

$$\cos(A+B) = \cos A \cos B - \sin A \sin B$$

$$\lim_{x \to 0} \frac{\cos x - 1}{x} = \boxed{0}$$

Find

$$\lim_{x \to 0} \frac{\cos x - 1}{x} \cdot \frac{\cos x + 1}{\cos x + 1}$$

$$\lim_{x \to 0} \frac{-\sin^2 x}{x(\cos x + 1)} \longrightarrow \lim_{x \to 0} \frac{\sin x}{x} \cdot \lim_{x \to 0} \frac{-\sin x}{\cos x + 1}$$

$$\downarrow \qquad \downarrow$$

$$1 \cdot 0 = \boxed{0}$$

$$\frac{d}{dx}\sin x = \cos x$$

Find

$$\frac{d}{dx}\cos x = -\sin x$$

$$\frac{d}{dx}\sin x = \lim_{h\to 0}\frac{\sin(x+h)-\sin x}{h}$$

$$= \frac{\sin x\cos h + \cos x\sin h - \sin x}{h}$$

$\sin x\cos h - \sin x + \cos x\sin h$

$$= \frac{\sin x(\cos h - 1) + \cos x\sin h}{h}$$

$$\lim_{h\to 0}\frac{\sin x}{1}\cdot\lim_{h\to 0}\frac{\cos h-1}{h} + \lim_{h\to 0}\frac{\cos x}{1}\cdot\lim_{h\to 0}\frac{\sin h}{h}$$

$$\sin x\cdot 0 + \cos x\cdot 1 = \boxed{\cos x}$$

Find (use quotient rule)

$\frac{d}{dx} \sec x$

$\frac{d}{dx} \tan x \longrightarrow \frac{d}{dx} \frac{\sin x}{\cos x}$

$\frac{d}{dx} \csc x$

$\frac{d}{dx} \cot x$

Homework

- Sect. 3.5

1–10 (enough), 12, 14, 15, 17,

20, 21, 29, 30, 35, 36, 39 (show work)

- Quiz 3.1–3.4 (Tues)
- Weekly Review due